Coursework Introduction

COMP 3222/6246
Machine Learning Technologies

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Today's lecture

- Coursework Submission – what and when?

- Task and Data

- Design and Implementation

- Evaluation

- Frequently Asked Questions (FAQ)

- Marking Scheme

- Q&A

Coursework Submission – What and When?

- Deliverables and Deadlines
  - Machine learning pipeline implementation
    - Jupyter notebook
    - Submit as source_code.ipynb + requirements.txt
    - Week 12 Fri 4pm (timetable week 15)
    - Marking weight 15%
  - Final report
    - Week 12 Fri 4pm (timetable week 15)
    - Submit as report.pdf
    - Marking weight 35%
  - Total coursework mark is worth 50%
  - Turnitin checked >> Code and PDF reports must be your own work
- Feedback
  - 4 weeks after submission

Task and Data

- Task
  - Design/build algorithm(s) to classify social media posts with imagesp as 'real' or 'fake'
- Background
  - AI verifying multimedia content automatically can help tackle viral fake news
  - New algorithms support journalists and platform providers offering news content (e.g. Google, Facebook)
  - This was a real MediaEval challenge task for international researchers!
- Definition of a fake post
  - Reposting of real multimedia, such as real photos from the past re-posted as being associated with a current event
  - Digitally manipulated multimedia
  - Synthetic multimedia, such as artworks or snapshots presented as real imagery

Task and Data

- Dataset - Zip on module page
  - MediaEval 2015 dataset of social media posts

    Test set posts 3,781

    Training set posts 14,483

    Unique images/videos referenced 399

    News events 11

  - Each post contains text & mentions of a linked or embedded image/video

  - MediaEval 2015 image features will NOT used to keep task simple

  - Format - tab delimited UTF-8 CSV

    TweetId, tweetText, userId, imageId(s), username, timestamp, label

263259176497737728
'New York "attacked" by Sandy.
#NewYork #statueofliberty #hurricane
#Sandy #dark #attack #sky
#picoftheday # http://t.co/6PSNTCj9'
458337011
sandyA_fake_48
DimPhil1
Tue Oct 30 12:40:53 +0000 2012
fake

Nepal earthquake (fake)

Nepal earthquake (real)

Garissa Attack (real)

Solar eclipse (fake)

Samurai Ghost (fake)

Dataset contains text and metadata only
You should NOT process any images

Design and Implementation

- Algorithm Design and Implementation (COMP 3222 - UG)
  - Problem characterization
  - Data characterization
  - Data analysis & hypothesis formulation
  - Algorithm choice (2 algorithms) with justifications
  - Pipeline Implementation
  - Evaluation – F1 Score
  - Iterative improvement of the chosen algorithms
- Algorithm Design and Analysis (COMP 6246 - MSc)
  - Problem characterization
  - Data characterization
  - Data analysis & hypothesis formulation
  - Algorithm choice (3 algorithms) with justifications
  - Pipeline Implementation
  - Evaluation – F1 Score and other evaluation metrics
  - Critical review - 3 strengths and 3 weaknesses + ranking

Design and Implementation

- Refer to Coursework Specification

Evaluation

- Evaluation (COMP 3222 - UG)
  - Metric - F1 score (but you might want to report P, R, ROC ...)
  - Binary class labels == 'fake' (positive) or 'real' (negative)
  - TP >> Classified fake + Ground truth fake
  - FP >> Classified fake + Ground truth real
  - TN >> Classified real (or unknown) + Ground truth real
  - FN >> Classified real (or unknown) + Ground truth fake

    Label might be unknown if you choose to filter out results below a certain confidence threshold

Evaluation

- Evaluation (COMP 6246 - MSc)
    - F1 Score and other evaluation metrics to be used for ranking
    - Critical review of 3 algorithms, for each identifying 3 strengths and 3 weaknesses
    - Compare all 3 algorithm designs against each other
    - Rank algorithm designs in order of suitability to the task with justifications

Final Report

- Final report 5 to 10 pages long

- Mandatory final report sections
  - Introduction and data analysis
  - Algorithm design
  - Evaluation
  - Conclusion
  - References

- Refer to coursework specification

Frequently Asked Questions (FAQ) - see assignment PDF

- Justify all your choices
  - Marks are awarded for the method you used and evidence-driven justifications for your design decisions

    There is no 'correct' final design or F1 score

Frequently Asked Questions (FAQ) - see assignment PDF

- Consider enriching the data

    – You cannot use external task-specific data

    MediaEval image features, list of task-specific faker usernames

    – You can use external generic data

    NLTK stopwords, lists of common first names, lists of respected news organizations, sentiment word lists

    – You can pre-process your data and make new features

    n-grams, TF-IDF, Stanford POS and NER taggers, VADER sentiment analysis

    – What is the humour label?

    Humour label should be treated as a Fake label for eval. It might be helpful for training (or it might not!)

    – You cannot edit the test dataset to make it easier

    F1 scores must be run on full test dataset to allow a fair comparison of results

Marking Scheme

Refer to Marking Scheme document

Things to note:

Show us things like graphs, histograms, confusion matrix, ranked lists of top features, skew in data segments, gap analysis … The lab on "Data analysis and visualization" will help here

Show us evidence of iteration, such as how you fine-tuned or optimised your design/parameters during the evaluation process

Show us how each design choice compares to each other, rank choices, discuss why you rejected other choices, cite results for algorithms in published papers

Thank you…
Q&A

Next Lecture

Use Case 1 by Dr Luis-Daniel Ibáñez

See you again during weeks 9 and 10